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**Multimodal meaning-making about environmental awareness and sustainability: Connecting children globally through digital postcards**

AERA SIG: Critical Perspectives on Early Childhood Education, Round Table, San Francisco, Saturday April 27, 2013, 12:00-1:30 pm, Hilton Union Sq., Imperial Ballroom B

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**Introduction**

Over the last decade, there has been an ever-growing discourse around environmental issues in education and situating sustainability concepts in early childhood learning (Barrett Hacking, Barratt & Scott, 2007). Some authorities believe that if an ethic of caring is not established during childhood, the first few years of life, then these attitudes may never be developed (White, 2004). Therefore, many began to consider how children could be stimulated and encouraged to reconnect with local, natural environments. Noddings (2010) argues for a care ethic in education that cultivates empathy and critical thinking, important character qualities for challenging status quo beliefs.

It has been suggested that environmental education would be more effective if educators/ researchers better understood how children see and conceive nature, so that learning can be more grounded in the child's conceptual framework (Wilson, 1984; Payne, 1997 in Martin, 2007). Redman and Wiek (in Johnston, 2012) suggest five basic elements of sustainability, beginning with awareness of sustainability. This is followed by creativity to develop solutions; stewardship of natural resources; promotion of learning and adaptive institutions; and embracing values of inclusiveness and social justice. Further, Barrett Hacking, Barratt and Scott (2007) report that there is a "growing body of research that stresses the formative importance of environmental experience in childhood in developing relationships with the environment and environmental concern" (p. 530).

Louv's (2005) *Last child in the woods* brought the discussion into the public domain, challenging education to examine notions of play, and children's sense of place in their natural world. As the concerns for our planet's climate change increase (Miller, 2007; Oxford & Lin, 2012), one could suggest that global awareness is not just limited, but not clearly understood, nor experienced by children. Researchers know very little about how environmental attitudes and behaviours develop during childhood, and even less about possible cultural differences in them (Evans, Juen, Corral-Verdugo, Corralize & Kaiser, 2007).

Despite multiple studies about children's environmental awareness, understandings and

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perceptions (Barazza, 1999; Bowker, 2007), much of the research has been quantitative, measuring attitudes, perceptions and understandings. This current study involved researchers from Cairns, Australia and Toronto, Canada implementing a qualitative emergent and arts-based research methods to ascertain (cross-culturally) young children's place-consciousness and environmental awareness through online digital postcards. The significance and innovation of this project was the use of approaches through drawing, painting, storytelling and a blog, to provide essential meaning-making spaces.

With a view of the child as being an agent in his/her own learning, researchers hoped to stimulate children's interests in their local, natural environments, widen their knowledge of foreign environments and promote and instill environmental sustainability values and problem-solving skills. The research question explored how can we use arts-based, multimodal methods in a cross-country online learning environment to determine and enhance young children's understanding about their and others' environments and environmental sustainability.

Allowing children to create visual narratives of understanding and tell stories, allowed the researchers to enter into their conceptual understandings of self, others and the world (Binder, 2011). While the research explored how arts-based, multimodal methods in a cross-country online learning environment can help to determine and enhance young children's understanding about their and others' environments and environmental sustainability, for the purpose of this paper, the researchers will focus on what emerged from the visual narratives and stories created by children in both countries, the intersection, supported by the interviews, and the approach of online learning using blogs enhanced environmental awareness.

### **Conceptual framework**

The conceptual context for this study incorporated the intersection of three major frameworks: the child as agentic, social-constructivism and a sociocultural perspective and multimodalities. A transdisciplinary approach provided a "holistic and synergistic approach to studying an issue or problem" (Leavy, 2011, p. 29). This enabled the researchers to engage in the emergent quality of the research, allowing the children to be active participants, expressing ideas in a variety of modes to convey understanding and directing the research, in some cases, as it unfolded.

#### ***The child as agentic***

This research positions the child as agentic. They are capable and competent actors who appropriate and reproduce aspects of their culture through interaction with others (Corsaro, 1997). Further, childhood has a social status of its own (James, Jenks & Prout, 1998). Children are in a process of being, rather than becoming, during the early years of life. They participate actively in their world, making meaning and co-learning with other children and adults. Adults negotiate, challenge and guide children, and co-construct experience and ideas (Sorin & Galloway, 2005; Corsaro, 1997; Marr & Malone, 2007). Positioning the child as agentic, challenges the notion of the innocent, powerless child. As James, Jenks and Prout (1998) note, "Children are not pathological or incomplete; they form a group, a body of social actors, and as citizens they have needs and rights" (p. 32). Research is with children rather than about them (Sorin & Galloway, 2005; Sorin, 2005) and their voices ideally resonate in all phases of research, from design, through data collection to interpretation. Similar to the Reggio Emilia movement, "the child is seen as an active, curious and self-motivated learner and the curriculum is negotiated and emergent—actively designed with and by students focusing on their strengths and abilities" (Sorin & Galloway, 2005, p. 19). Viewing the child as agentic can lead educators and researchers to critically examine situations, power

relationships and discourses in operation in early childhood education, and to improve and transform the lives of children through helping to bring about change in policy and practice (Yelland and Kilderry, 2005; Sorin, 2005).

### **The child as learner: sociocultural approaches to learning**

Social constructivism might be the best lens for thinking about how a child internalises an idea and a sociocultural perspective a better lens for analysing the influences of the social/cultural aspects of the learning environment (Van de Walle, Karp and Bay-Williams, 2013). Driver and Bell (1986) identify key features of this paradigm as the construction of meaning being influenced by the existing knowledge of the learners and the learning environment; as an ongoing and an active process by the learners; and as learning being influenced by experiences with the physical world and forms of representations, including language. Children are active participants and decision makers, who construct their own understanding and contribute to others' learning.

A sociocultural approach to learning emphasises the socially negotiated and embedded nature of meaning-making (Murphy & Hall, 2008). Central to a sociocultural perspective is the idea that knowledge exists between and among individuals in social settings and learning occurs through interactions that are influenced by different cultural, multimodal representations (language, pictures, etc.) within and beyond the classroom. Children's awareness comes from the understanding they bring to their diverse experiences, perspectives, expectations, knowledge and skills (Vygotsky, 1978).

According to McLachlin, Fler and Edwards (2013), project approaches are commonly used in social constructivism. With this approach, "teachers help children scope and sequence learning and enable children to move from personal, concrete and physical learning experiences to abstract, verbal and intellectual understandings" (Schiro 2008, in McLachlin, Fler & Edwards, 2013, p. 18). The teacher's role is that of observer, and from observations the teacher sets up supportive learning environments. "The teacher may also intervene between the child and the environment to assist learning" (Schiro 2008, in McLachlin, Fler & Edwards, 2013, p. 18).

### **Multimodalities**

Drawing and storytelling can be linked to multimodal theories, and combined with the concept of multiple literacies provides a compelling framework that challenges traditional modes of meaning-making by recognizing diversity in communication and expression (i.e., such as image, story, print, sound, gesture, etc.) (Larson, 2006; New London Group, 1996). Multimodal theory focuses on how integrating multiple sign systems can broaden the capacities of children to make meaning in many ways (Albert & Sanders, 2010; Binder, 2011; Binder & Kotsopoulos, 2011) and offer learning and communicative opportunities for young children that are not restricted to print. Anning & Ring (2004) suggest that young children's narratives offer tools for them to organise and explain their complex worlds, giving order, significance and meaning to the chaos of their experiences (Blizard & Schuster, 2007).

Indeed, it could be deemed necessary to discuss a child's drawing with the child to ensure that the drawing represents the child's intended meaning and interpretation, rather than the researchers (Benson, 2009). The concept of multiple literacies can allow teachers to access the rich repertoire of children's pictorial language, leading to new ways of understanding their experiences as well as their meaning-making through symbolic

representation. This is especially useful in diverse classrooms where the linguistic and cultural resources of students may be in tension with approaches to literacy learning that are linear and one-size-fits-all, which often hinders children whose native language is not English (Genishi & Dyson, 2009). The visual arts can provide opportunities to communicate ideas through the construction of intricate visual scripts (Crafton, Silvers, & Brennan, 2009) and it is within this context that children's situated understandings, real world experiences, and social histories interact with school mores. The visual arts can offer opportunities for children to express their experiences and understanding of their worlds in more depth than might be able to through traditional literacy practices (Goldberg, 2005; Wright, 2010).

### **Online learning environments**

With the emergence of HTML-based websites, blogs and participatory media in the late 1990s, ordinary citizens have been empowered to share their voices and perspectives without formal training or the authorization of traditional publishing structures (Nolan, 2003). Online writing and information design have become a fundamental means of contemporary knowledge acquisition, documentation and expression. A blog, short for "weblog," is a complete online publishing platform that allows individual or multiple authors to write and distribute written or multimedia content (Nolan, 2003). Unlike a static website, blogs are a repository of published posts that appear in reverse chronological order, with newest posts generated first and older content appearing in an archive.

Though the technical requirements of blogs and their uses by adults may not seem immediately suitable for early learning environments, they actually tie in quite well to existing curriculum, pedagogy and professional practices in a number of important ways. For example, in keeping with Reggio Emilia-inspired approaches to documentation, as well as social constructivist learning, blogs become a central repository of a student's learning and text to self, text to world and peer-to-peer interactions. In particular, as Vasquez and Felderman (2013) note, blogs engage young learners in a variety of emergent critical and multi-modal literacies through text, visual imagery, moving images, sound and interactivity. Children are often already engaging online media in informal learning contexts, under the eye of their parents, including pictures and video from family events, and important moments in children's lives (Bal, Nolan, & Seko, 2013; Halavais, 2006).

In education, blogs offer multimodal, dynamic and peer-to-peer conversations between communities of learners and teachers far beyond the classroom walls, when appropriate respect for children's privacy are engaged (Nolan, Raynes-Goldie, & McBride, 2011). For today's child, whose early years are increasingly saturated with digital culture, meaningful uses of online information tools are essential 21st century literacies. For children who are marginalized by more traditional modes of self-expression and sharing, blogs can provide a dynamic and globally-networked space for learning. For educators and children learning in socially isolated or geographically remote locations, blogs can foster connection to a more diverse community of learners (Nolan & Weiss 2002).

For the purposes of this research, we chose to use the Wordpress content management system installed at one of the research sites. The Wordpress blog was password-protected on a secure sever, and only the educators, researchers and research assistants had access to the site. Through input from children, teachers and researchers at both venues, the site, "Postcards Across Borders" contained 48 posts between September and December 2012, and a total of 339 images.

## **Methods**

This qualitative study used emergent and arts-based methodologies (Bamford, 2003; Hesse-Biber & Leavy, 2006, 2008; Rose, 2007). Leavy suggests (2009) the “visual arts-based methods allow for “synergistic practices” that foster a holistic view of the research project, where there is a tight fit between the research goals and the methods employed” (pp. 228-229). Arts-based methodologies are often overlooked due to a Western bias towards linguistic intelligences (Knight, 2008) with the general assumption being that anything we think, feel, or sense, can be said (or written) in textual language (Kendrick & McKay, 2004). Arts-based research is an alternative, qualitative method that can involve using the arts as a method, subject, form of analysis or all of the above (Huss & Cwikel, 2005). Children, particularly young children do not always have the words to describe what they see, think or feel (Binder & Kotsopoulos, 2011; Sorin, 2004).

### ***Overview of the study***

Data were collected from kindergarten children (ages 4 and 5) and their teachers in one classroom in Australia (Cairns), and one in Canada (Toronto) over a 10-week period.

### ***Toronto setting***

Eighteen children between the ages of four and five from a culturally and linguistically diverse junior and senior kindergarten classroom participated in this study. There were nine boys and nine girls with two teachers in the room. Both had ECE and one also had a Bachelor of Education Degree. Learning was based on an emergent curriculum that drew on the interests of the children while creating a balance between teacher- directed and student-centred learning. The kindergarten also had a large playground that had all natural wood and plants. A garden was planted each summer. The playground was shared with two other programs (toddlers and preschool in the learning centre).

### ***Cairns setting***

Twenty-two children between the ages of 4 and 5, from a largely middle class kindergarten in a suburb of Cairns participated in the research. There were 12 boys and 10 girls in the class, with a teacher and teacher aide. As one of two classes in the kindergarten, they shared a large, open-area outdoor playground and garden, and covered learning space with the other children. They also had an indoor space for large and small group activities, but, because of the warm climate, much of the activity occurred outdoors. Similar to Toronto, teachers employed emergent curriculum methods, drawing on interests of children and negotiating learning with them.

## **Role of the researchers**

The role of the researchers was one of participant observers. In each country, lead researchers consulted with other members of the team to reflect on sessions, plan what would happen in the following sessions, and when necessary, revise plans. Ongoing communication occurred between researchers and teachers at the early learning sites. In Canada, the lead researcher also conducted ongoing group sessions with the children, and read stories. She was actively engaged in working with children when they created their postcards, and throughout the pre and post interviews. In Australia, the lead researcher along with team members attended the kindergarten weekly, leading class and small group discussions, introducing and working with children during postcard, mural and story-making activities and conducting pre and post interviews. There was ongoing communication between the two research teams

through email and Skype.

### **Data Collection**

Prior to commencing the program, the researchers conducted interviews with the children about their environmental understandings. These pre-interviews asked children what they knew about their local environment and other environments, including any benefits or concerns about the environments. Teachers were asked what children knew about their environment, what they felt children need to know, and what curricula or actions were being taken to teach children about environmental awareness and sustainability. At the end of the 10 weeks, children and teachers were re-interviewed, again asking them similar questions.

Between the two interview sessions, children utilised arts-based methods (drawing, painting and storytelling) to create postcards of their environment to share with the children overseas. In total, three postcards were created and shared online; in some cases in response to specific children at the other venue. Further, learning was scaffolded by children, teachers and researchers through sharing of stories (e.g. “Over in Australia”), web searches (e.g. what does a frozen lake look like?), artefacts (e.g. a toy raccoon); word charts (e.g. list of local Australian birds), letter writing (from one class to the other), mural making (of both venues), and photographs of the children and the local venues (e.g. Toronto outdoor double slide).

Postcards, murals, word charts and letters, as well as providing data, were scanned and shared via a secure online blog environment, allowing children to respond and seek additional information from their peers.

### **Data analysis**

Data were analysed using arts-based methods. Content analysis examined the drawings for the presence or absence of features of the environment, and also for the frequency of representation. Merriman and Guerin (2006) affirm that “content analysis has an important contribution to make to the analysis of drawings [because] it allows both a qualitative exploration of what is drawn, as well as the potential for quantitatively considering how often particular themes or categories appear” (p. 50).

Interpretive analysis involved looking at the ways elements of design are presented, the mood of the picture, and the messages conveyed by the drawings and stories. This form of analysis is based on the assumption that the child’s drawings are displays of emotions, opening a window to the child’s ‘soul’, similar to an ‘open diary’ (Krenz, 2004). While interpretative analysis is based on careful observations and ‘reflective thought’ (Hansum-Ketchum, 2004), it has often been criticized with Vandergrift, Platzner, Hannigan, Dresang, Lewis, Brizendine, & Satchell (2000) stating that analyzing a drawing opens “multiple possibilities of interpretation”, as many different elements in a drawing could influence the researcher’s perception (e.g. Western held colour symbolism).

To balance the criticism, it must be taken into consideration that the nature of using visual texts requires an innovative and contemporary approach for research design, where the images children create are also recognized as valuable data to be interpreted and used to inform practitioner understanding (Rose, 2007). A multimodal approach provides the spaces for visualizing voice (Soto, 2005), and reveals the complexity of meaning-making incorporating a more holistic and synergistic way of looking at the issues (Leavy, 2012).

It could be suggested that examining the three digital postcards by each child is a form of discourse analysis (Rose, 2007) where each part connects to provide a more complete

picture of process and visual thinking. Theron, Mitchell, Smith and Stuart (2011) argue that drawing is “a visual participatory methodology” (p. 34) to be examined using a combination of representation and talking and/or writing.

Text from interviews, stories and class constructions (murals, word charts and letters) was coded using a grounded theory approach, where open coding identified patterns that were labelled for their conceptual content, and then applied to further text and refined to produce emergent themes. These themes were elaborated at both venues in terms of the research question and produced the following findings.

## **Findings**

### ***Overview***

Findings from this research demonstrate the effectiveness of arts-based methods for collecting data and aiding children to learn about environmental awareness and sustainability. Using multimodal approaches, such as online postcards shared through blogs to engage young children in making meaning of self, others and the world, are not prevalent in early learning environments. The postcards, constructed by drawing and storytelling, followed by sharing them with children across the globe, proved to be engaging and motivational for both the kindergarten children and their teachers. A Cairns teacher commented, “I think they have learnt that there are lots of things that are the same and those seem to be the things that they are really interested in. They seem to be fascinated by the idea of high rise buildings – that people live in different homes.”

Children at both sites looked forward to postcard days, when the researchers attended the class and they worked on their postcards. The postcard format, itself, was successful in that the size of the postcard was manageable for children to complete within the time and with the drawing materials available.

This paper addresses three themes that emerged from the research: the process of constructing and sharing postcards enhanced children’s agency; authentic relationships were built with children across the globe; and the use of blogs worked successfully to implement multimodal communication.

### ***Postcards and children’s agency***

All children had the opportunity to accompany their drawings with stories they had composed, describing their postcards. They took the lead with their choices: what they wanted to draw and what they wanted to say about their stories and, in Toronto, where they would like to place the stamp on their postcards. From the beginning, children were excited to introduce themselves stating their names, names of family members, and details about pets, interests and, of course, where they live. Figure 1 (below) is an example of this, where the child introduces herself, her interests, home and family.



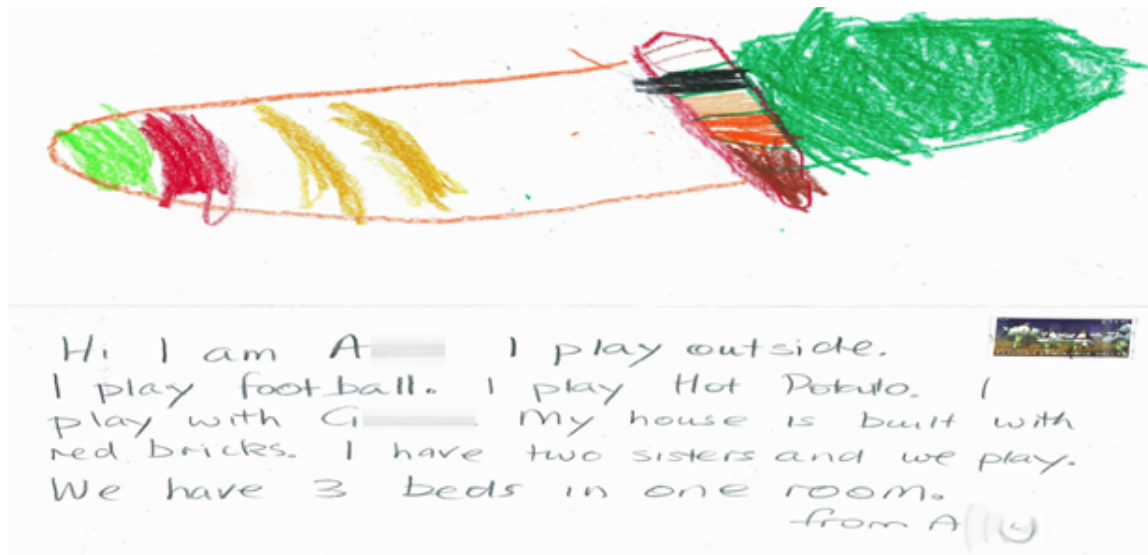


Figure 1 – Introducing themselves

By initially sharing personal stories and information with children in the other country, children were empowered and validated in their choice of content and what was important to them. This was enhanced by sharing photographs of each child with his/her counterparts in the other country.

Creating the postcards gave children who may not otherwise verbalize their understandings, a voice and mode of communicating that voice. Figure 2 (below) is an example. In the postcard the child communicates both visually and verbally a very detailed understanding of two Australian animals: the cassowary and the dingo.



Figure 2 – Demonstrating understanding through postcards

Inquiry began with the second round of postcards, where children had the opportunity to ask questions through the narrative and drawing. For example, based on viewing the postcards from the other country, an Australian child asked his Toronto friends, “Do you have trains that run under the ground?”

In both venues, there were viewings of the blogs and discussion, which gave the children the visuals and stories as cues for response. Figures 3 and 4 (below) illustrate this, where the child from Cairns, describes not being able to swim in the water, because of crocodiles and jellyfish. A Toronto child wrote back, drawing “all the oceans I know”, the ocean, red sea and black ocean and asking, “What oceans do you know? Do the sharks in Australia bite?”



Figure 3 – Postcard from Cairns

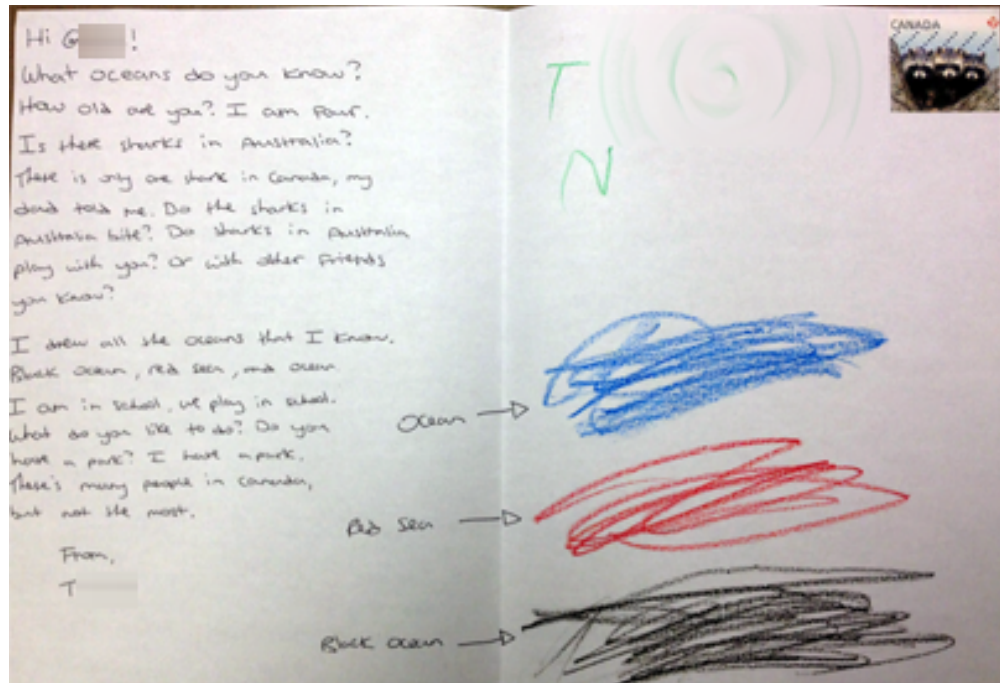


Figure 4 – Toronto Response

By having an authentic audience for the postcards, children created increasingly elaborate stories, which they dictated to teachers and researchers; they looked forward to “reading” the postcards from the other class. Further, the inquiry-based methods allowed children to become more aware of their own as well as the other environment. This positioned children as agentic and offered motivating and engaging learning experiences.

In both Toronto and Cairns, the excitement and motivation was not just restricted to weekly researcher visits. There was discussion and questioning throughout the week as children waited in anticipation for the researchers’ visits. One of the Toronto teachers shared this story, early in the project, of the children deciding it was time to take a field trip to Australia.

Teacher: They were sitting at lunch and they said they needed a field trip. And that they wanted to go to Australia. So they started talking about that they would have to take an airplane and it would be a long way. They were really concerned about a couple of children... The entire lunch hour was how do we keep this one child sitting down long enough so we can fly to Australia?...

another child suggested that they bring an iPad and some movies, because that would always help him to sit still...

[He said], “I promise you I won’t run up and down. Please take me.” And then they turned to me at the lunch table and said, “So when should we pack out bags. I’m going to miss my mommy and daddy. Do they come with us?” The whole discussion around lunchtime was that this was going to be their field trip. This trip to Australia was actually going to happen. But they

really, really worked out a lot of details about flying and managing on the airplane.

This led to mapping, increased interest in climate, and transportation; for example discussing how long it might take to get there, and the understanding of the distance between the two cities. This interest emerged completely from the children's interest in the project and the motivation sustained them for the duration of 10 week project and after the project had ended.

As noted above, the Cairns teacher reported the children's fascination with living in apartments, which is quite uncommon in Cairns. To follow this up she read a story about different kinds of dwellings around the world, and reported:

That's been threaded through with some of the books I've read. Someone will say "Oh that's like in Toronto." They would make comments on it. Difference in weather. They're really switched on about that. Difference in climate. I think if we had more time they would also be very interested in the animals.

The story and discussion about dwellings led to further stories, as described by the teacher:

Based on the story we've read, we follow through with group discussions about, you know, what was happening in the story. "Why was this happening? Does it snow?"... Like we were reading a Christmas book and I said "Do you think this book is in Australia?" And they're like "No, no it's snowing." I don't know if they would have made that comment prior to [the postcards project]. So they can see no, it can't be in Australia.

Children in this research demonstrated agency through their willingness to participate in the research, their choices of what to draw and what story to tell about their drawing, and by, through their comments and interests, they guided the follow up learning scaffolded by their teachers.

#### ***Authentic relationships with children across the globe***

While children were not initially matched with specific children at the other site, a number of them chose to respond to a specific child's postcard, and carried the relationship through over the sessions. A teacher described this as an 'empathic connection,' noting,

They really saw the children in the [other] kindergarten as their friend. That was their friend. You could see the emotion that was starting to come out from writing back and forth and yet to have never met them. They made a connection.

Illustrative of this connection is the dialogue pictures between two children, S. and K., who discussed houses, pets and travel. K. chose to respond to S.'s first postcard as follows in Figure 5:

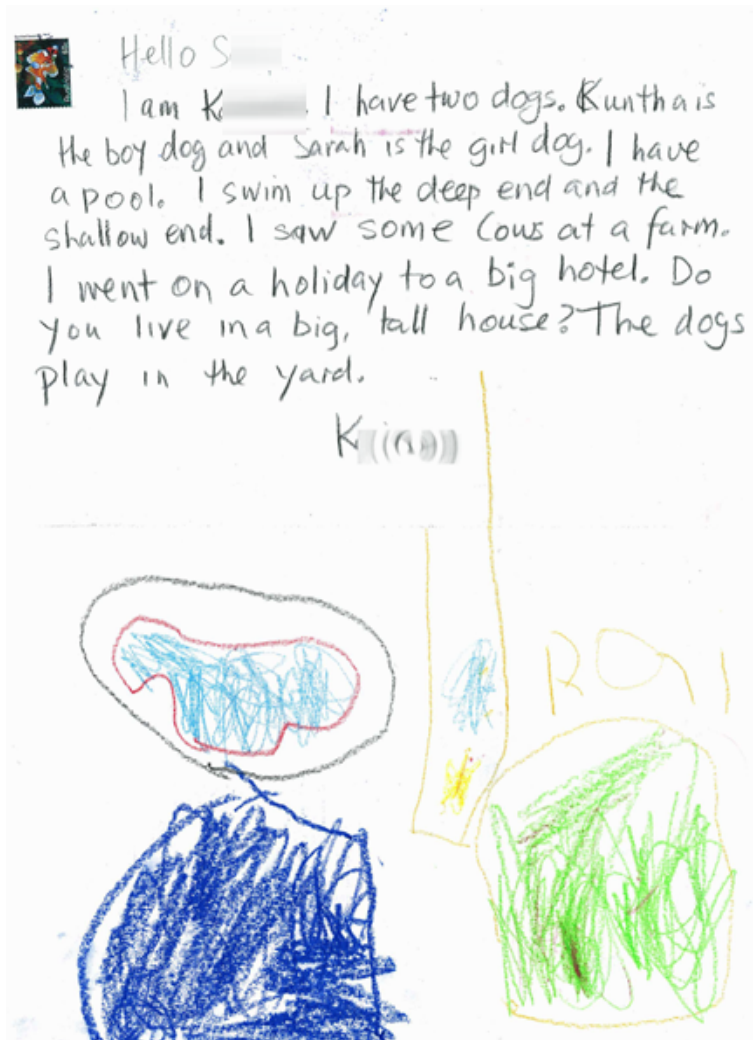


Figure 5 – K.'s response

In response to K.'s question, 'Do you live in a big, tall house?', S. said, "I don't live in a tall house. There is a big kitchen and there is a bedroom for me, my mom, and my dad. And there is an office. My house is wide" (see Figure 6).



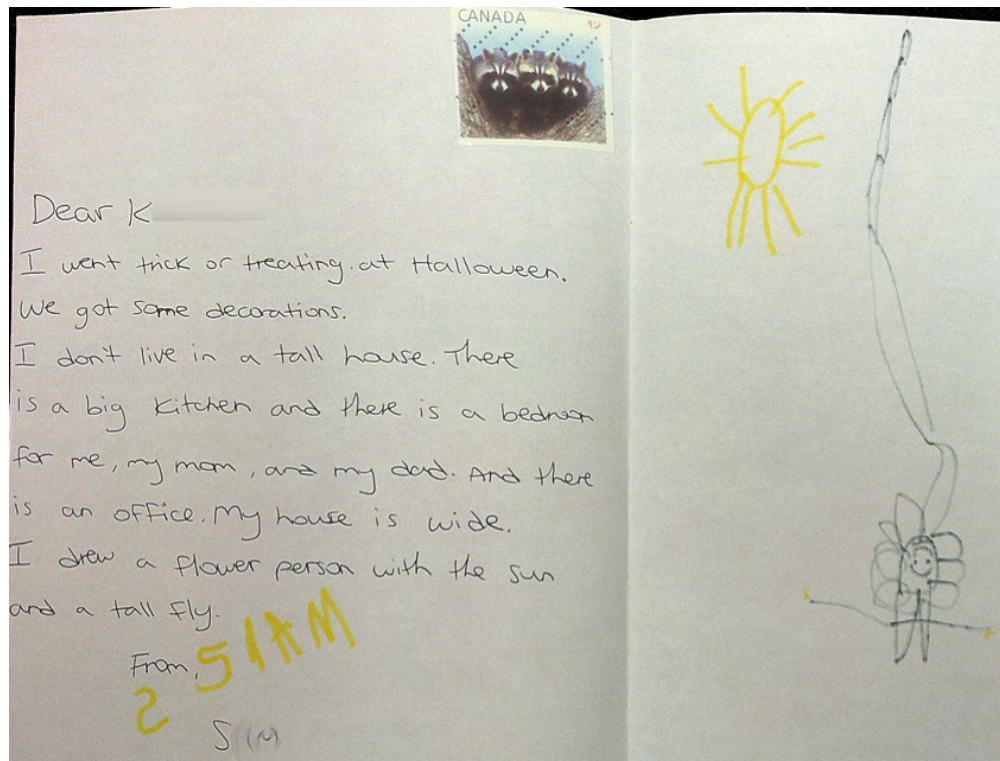


Figure 6 – S.'s response

A sharing of information about each child's personal life appears to have been initiated. This is supported by K. stating he has two dogs, a pool and went on a holiday to a big hotel. S. appears to reciprocate by stating he went trick or treating for Halloween and got decorations.

S. created a further postcard for K., reiterating that he lives in a 'short' house and responding to K.'s description of his pets and his travels with a description of his cat, and a further question about K.'s travels. S. ends by inviting K. to travel to visit him, in Toronto (Figure 7 below).

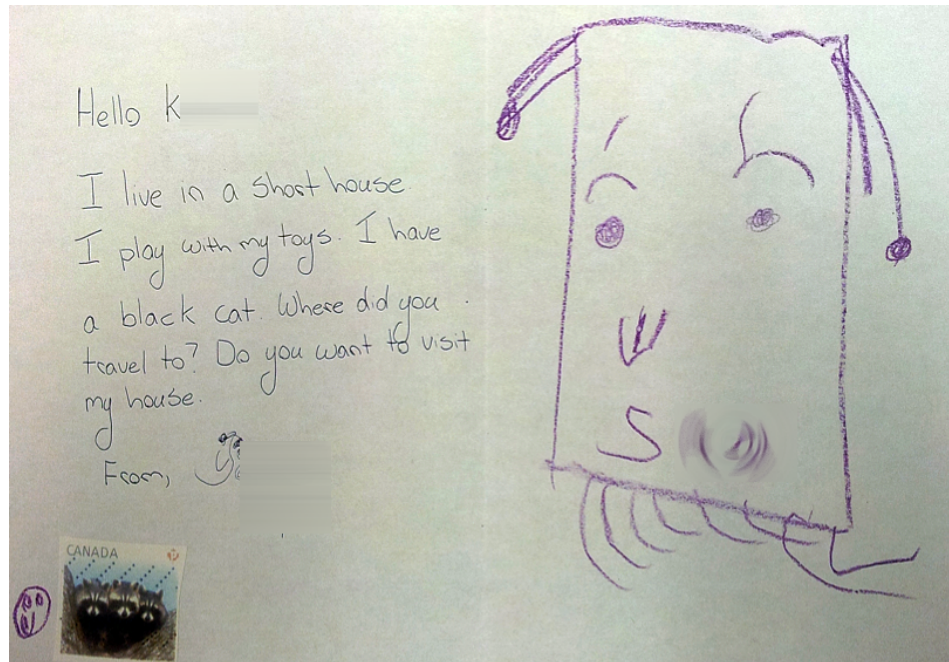


Figure 7 – S.'s final response

W. and R. formed a similar, authentic relationship. W. introduced himself in his first postcard, stating that he lives on the ninth floor of an apartment building in Toronto (figure 8 below).

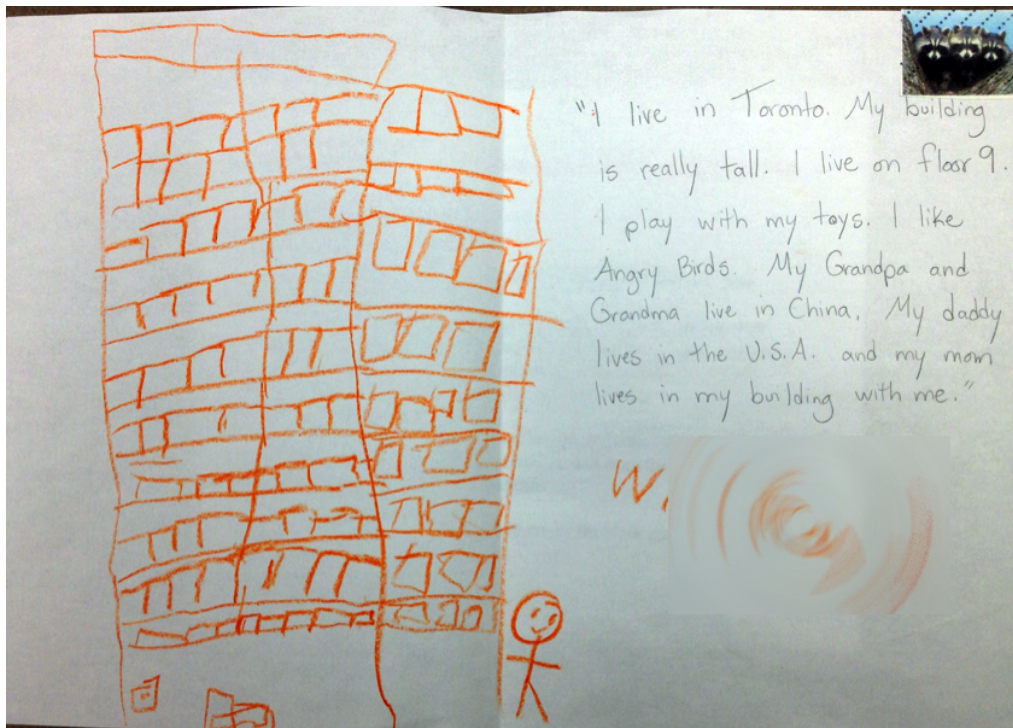


Figure 8 – W.'s introductory postcard

The concept of high-rise buildings fascinated the Cairns children, who for the most part live in houses. R. chose to respond to W., asking him if there was an elevator or steps in his building, and detailing his life in Cairns, including his house, mother, brother, favourite food,



and toys. Further he talked about his grandparents in Japan and what he did when he was in Japan (Figure 9 below).

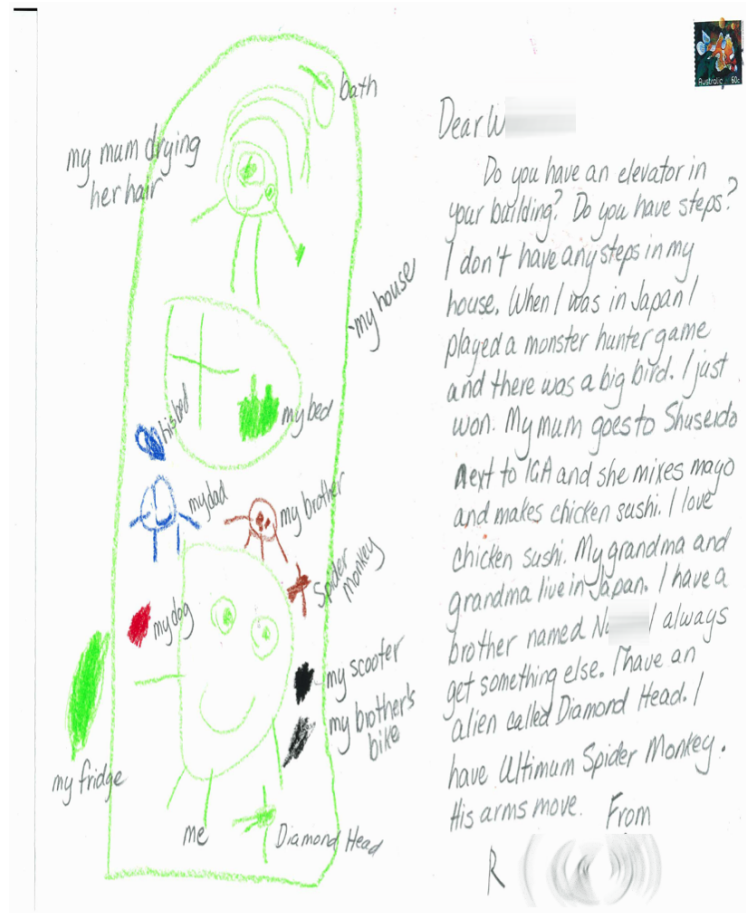


Figure 9 – R.'s response to W.

W.'s next postcard responded to R. by further describing his apartment building and the back yard play area (Figure 10 below).

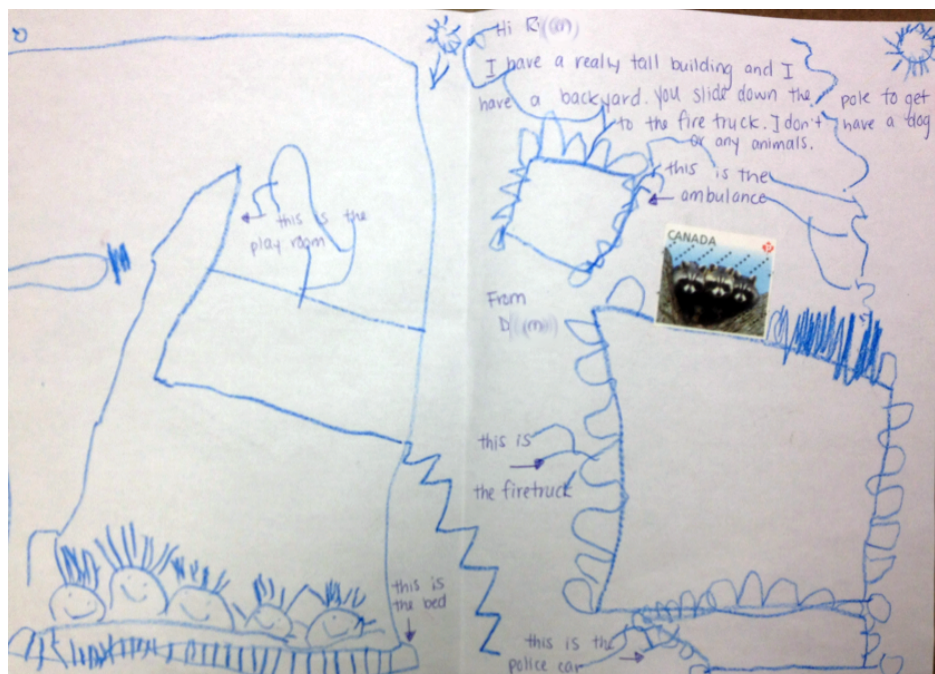


Figure 10 – W. describes his building and back yard.

Both children's postcards contained detailed, almost map-like illustrations with accompanying descriptions of the content of the drawings. They used bold colours and eagerly strived to detail their environments to share with their friend in the other country. Information was retained by the children. For example, in the post program interview, R. described where his friend, W. lives. He mentioned that W. lives in Toronto, which is a big city, in an apartment building. He knew that in Toronto "It is cold for me."

Authentic relationships were established through the postcard project, and could have been continued, had it not been that the Australian school year ended and the children were moving on to formal schooling. The Canadian children could have continued the postcards until June of the following year, had the school years matched.

#### ***The use of blogs worked successfully to implement multimodal communication***

The use of a blog as the means of viewing and communicating with each other, offered the children experiences in developing narrative skills that were not confined by the linearity of solely printed text. In Toronto for example, the research team used the classroom computer, laptops and iPads with individual children and small groups to view the blogs and spend time with the Australian postcards. In Cairns, the research team used a laptop computer and a data projector to view images and stories from the Toronto children. The children began to see the communicative aspect of a blog through drawing and dictated stories (also through sharing photos). The implementation of a digital format empowered children's voice and offered autonomous spaces for them. It is anticipated that this enabling and enriching lens will only strengthen understanding and begin the discourse about how planetary changes may impoverish the lives of others and demonstrate the need for critical pedagogical spaces for children in the learning environment through multimodal approaches.

The blog format allowed child participants the opportunity to 'read' the other children's drawings, and in so doing to learn about themselves and others – who they are and

where they live, and sustainability issues in each place. A Cairns teacher reported increased knowledge of the local environment. She said that at the beginning of the research, the children “were focusing just on their homes and their backyards. Now their conversations are much broader – they’re talking about their camping trips, some of them are talking about the parks and rivers and freshwater – they’re definitely broadening out to the rainforest.” Further, a Toronto teacher noted learning about the Australian environment and environmental issues through the blogs:

I think it was interesting that the children learned about the Great Barrier Reef being near Cairns, and you had mentioned in one of your visits that part of the reef is dying or that parts of it have been destroyed. The children were interested in why that had happened. Then we began to talk about our own lake Ontario, just off our shores here, and how we need to keep it clean and how if there is garbage or pollution in our water how that affect the fish that live there, and the plants and of course our drinking water, as well. We also began to talk about how we can make out water cleaner here?

Through participating in information sharing through the blogs, children’s agency and autonomy increased. They read the pictures and made connections with information that interested and engaged them. For example, in response to M. in Cairns’ description of her pool at home (Figure 11 below), V. in Toronto created a postcard with the pool and tropical weather at a holiday spot she’d visited (Figure 12 below).

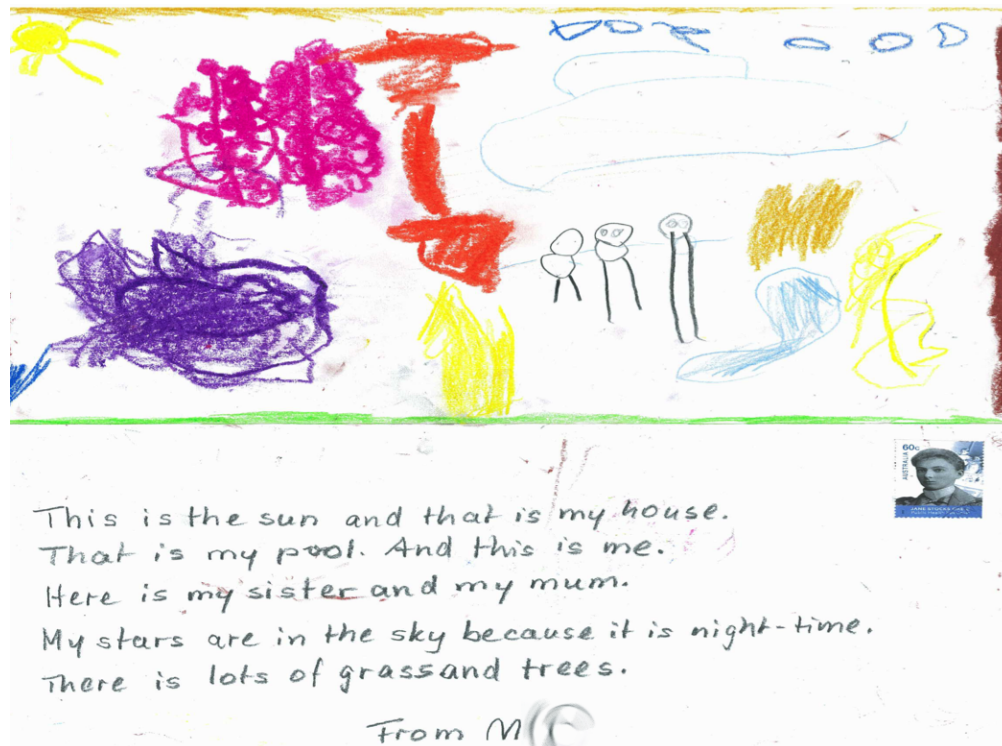


Figure 11 – V.’s postcard of her pool at home

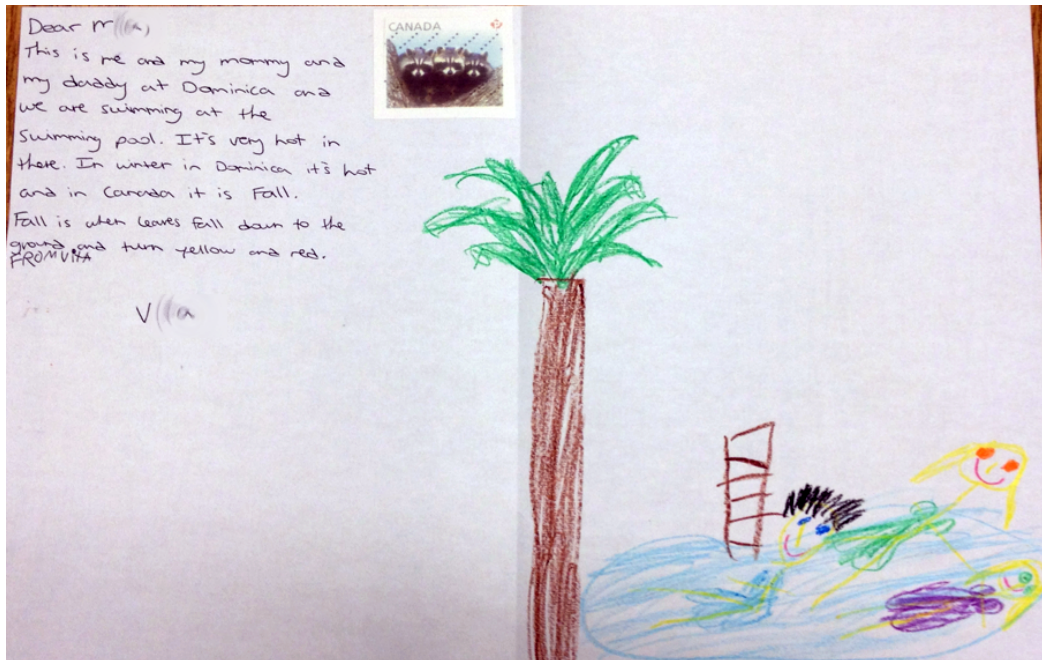


Figure 12 – V.'s postcard of the pool and tropical environment at her holiday spot

The above examples also demonstrate how texts support visuals, and visuals support texts in the postcards, made possible through the blogs. The blog format enabled children to have the communal experience of viewing images together. The children were able to reflect and brainstorm ideas about the images they saw and what they liked, as well as generate questions and further inquiry.

Blogs were a method for sparking interest in things beyond the immediate surroundings, as well as increasing spatial awareness. Further, the blog format allowed children to share photographs as well as postcards online. Photographs shared were of the children themselves, and also of the learning environment. In many cases, the children themselves took the photos. The photos, combined with the postcards, enhanced the learning, as children in each location looked for similarities and differences between the Toronto and Cairns learning environments. The Toronto outdoor double slide intrigued the children in Cairns. They hadn't seen a double slide, and questioned what happened to the slide in winter. J. noted that in winter, "the slide turns to ice and they can have a slippery slide." He picked out differences between this slide and many of the slides in Cairns, speculating, "The slides in Cairns go into a pool. If the pool turned to ice you could go ice skating." In the latter weeks of the project, a number of the Cairns children chose to create a mural about what they'd learned about Toronto. This included snow, tall buildings and pine trees. J. drew a double slide, log stairs, and children coming down the stairs (Figure 13 below).





Figure 13 – Cairns children's mural of Toronto

Children created a mural about Toronto. J. drew a double slide, log stairs and children coming down the stairs.

While the blogs supported and enhanced learning, the online format encouraged children to search beyond the postcards to find out more about their own and the other environment. For example, the Toronto children searched for key features of Australia environment in order to help elicit their memories as well as spark interest for further investigation. It proved a useful tool for young children across topics and disciplines, in this case literacy, science, geography and the arts. The blog enabled the children to connect with others in other places, and to increase their ability to relate to others across cultures and geographic areas.

However, blogs can be problematic, particularly if researchers/staff are not familiar with the technology and/or do not have consistent online access and appropriate hardware. Today we need to think about our role as educators in bringing these tools in and as researchers, how it opens up communicative potentials and builds capacities.

### ***Environmental awareness***

Environmental awareness, which according to Redman and Wiek (as cited in Johnston, 2012) is the first process in sustainability understanding, was evident in this research. Through developing agency by constructing and sharing postcards, building authentic relationships with children across the globe, and using blogs to implement multimodal communication, children's awareness of their own and the others' environments was clearly demonstrated. For example, a Toronto teachers reported:

The main thing that they had talked a lot about were the different animals that were in [the Cairns] environment and that really intrigued them... They also talked a lot about the fact that there were less buildings and buildings that were not as tall as the ones in Toronto. And the climate was also a focus for them. The opposite climate [to what] they had. They also mentioned that the school was near the water. So that brought a lot of discussion about ocean life.

### ***Conclusion***

The Postcards Across Borders project was engaging and motivating for the child participants in the research, who looked forward to sharing their images and stories with their counterparts across the globe, and to receiving postcards from them. They took their interests

further, exploring a number of issues about the other country in their day-to-day classroom learning.

Children's agency was enhanced through their choices of creating postcards, including whether they wanted to create a postcard, to whom they wanted to direct their postcard, the images they used, and the text to accompany their images. For a number of children, authentic relationships were established with children across the globe. They directed their postcards to specific children and were able to share information from that child with others in their immediate contexts. Their communication continued over a number of sessions and would have continued on had the project been extended. For all, learning about the other country gave them a global connection to the world beyond their local environment.

This was greatly assisted by the use of a secure, online blog. Cognizant of the need to protect children's identity online, and respect the fact that children may not be able to make an informed choice as to whether they wanted their work and personal information made public, we chose a technology that afforded them the maximum amount of privacy (Nolan, Raynes-Goldie, McBride, 2011). By using a blog that required user authentication in order to view the content, and by restricting users to classroom teachers and researchers, we were able to provide children the opportunity to share their work with each other, while ensuring to the best of our ability that children's personal information was not publicly available. This gave children the opportunity to share individual images and stories as well as group and class creations, including letters, a video of a class song, word charts, murals and group stories.

The multimodal methods used in this research: visual texts of various formats, narratives and blogs, worked well to determine and enhance these young children's understandings about their local and foreign environments. According to Redman and Weik (as cited in Johnston, 2012) environmental awareness is the first process in sustainability understanding. Had the project continued, we feel that sustainability would have been more of a focus in the children's communications.

Future research will be undertaken, preferably over a more extended period of time, with other geographic locations. But arts-based, multimodal methods will continue to be used to determine and enhance environmental understanding and sustainability.

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